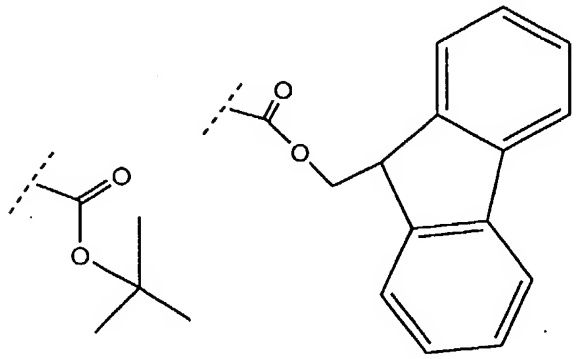
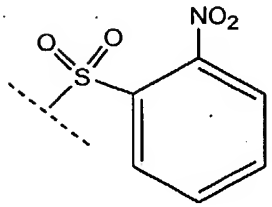
As used herein the term "protecting group" (and abbreviated as "prot") refers to a moiety that protects the atom of interest from attack during synthesis, and which can be easily removed at a later stage during formation of the desired compound of interest. Protecting groups are well known in the art. Suitable protecting groups include, but are not limited to, Boc, Ns, Fmoc and Cbz as defined by the following formulas:



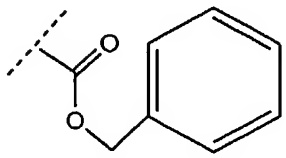
Boc

Fmoc

applicants prot. group



Ns



Cbz

The first class of molecular building blocks, the "proline" monomer class, has been synthesized as shown in (Scheme 1). The synthesis starts from the inexpensive chiral starting material *trans*-4-hydroxy-L-proline and uses a key Bucherer-Bergs reaction[1] to convert a ketone into an amino acid through a hydantoin. These building blocks display two differentially protected α-amino acids on a five membered ring. They hold their preceding and following partners in an extended orientation and can be combined to form extended rods. The distance from one monomer to the next in an oligomer is about 5Å, allowing us to construct molecular